

## Abstract

DNA vaccination using plasmid encoding the hemagglutinin (HA) gene of influenza virus to induce long-lasting protective immunity against respiratory infection is disclosed. Efficacy of DNA vaccines is shown using a lethal influenza infection model in mice by employing liposomes as carriers. Mice immunized intranasally or intramuscularly with liposome-encapsulated pCI plasmid encoding HA (pCI-HA10) are completely protected against an intranasal 5 LD<sub>50</sub> influenza virus challenge. Mice immunized with liposome-encapsulated pCI-HA10, but not naked pCI-HA10, by intranasal administration are found to produce high titers of serum IgA. The present invention shows that DNA vaccines encapsulated in liposomes are efficacious in inducing complete protective immunity against respiratory influenza virus infection.